Duperreya Gaudich. (Convolvulaceae) revisited

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Summary

Johnson, R.W. (2009). *Duperreya* Gaudich. (Convolvulaceae) revisited. ***Austrobaileya* 8(1): 47–54**. The history of the genus *Duperreya* Gaudich. and its reinstatement in Australia is discussed. Three species are recognised and a key is provided for their identification. *Duperreya halfordii* R.W.Johnson is described as new. Descriptions and distribution maps are provided for all species as well as information on their distribution, habitat and phenology. Key identification characters are illustrated.

Key Words: Convolvulaceae, Australian flora, *Duperreya*, *Duperreya halfordii*, *Porana*

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Introduction

The genus *Duperreya* was described by Gaudichaud (1829) based on a specimen he collected from Shark Bay in Western Australia. Both Choisy (1837, 1845) and Endlicher (1839) maintained *Duperreya* as a monotypic genus closely related to *Porana* Burm.f. Mueller (1867) concluded that *Duperreya* was a synonym of *Porana* and transferred *D. sericea* Gaudich. to the larger and more widespread genus. However, Mueller (1860) had previously described *Ipomoea modesta* F.Muell. based on an Oldfield specimen collected beside the Murchison River in Western Australia. This name was illegitimate due to an earlier *I. modesta* described by Choisy (1854). Mueller also realised this taxon was the same as *Porana sericea* and noted this in his list of synonymy. Bentham (1869), Peter (1891) and Hallier (1893) accepted the transfer of *Duperreya* to *Porana* though Peter recognised its difference by including the genus in the monospecific section *Duperreya*. Schneider (1916) in a study of the genus *Porana* concluded *Duperreya* was sufficiently distinct from *Porana* to be maintained as a separate genus. Until recently Australian authors have followed Mueller's treatment of *Duperreya*.

Staples (1987) revised the Australian species of *Porana* and described a new species *P. commixta* Staples. More recently, Staples (2006) published a comprehensive revision of the Asiatic *Poraneae* in which he reinstated the genus *Duperreya* comprising two species, *D. sericea* and *D. commixta* (Staples) Staples.

In preparing treatments of the Australian Convolvulaceae for the *Flora of Australia*, David Halford and I found that specimens of *Duperreya commixta* from Queensland and New South Wales did not fit within the species concepts proposed by Staples (1987, 2006). Staples (2006) did note that specimens of *D. commixta* from the Cobar area in New South Wales had wider sepals than those from Queensland and Western Australia but in other respects they were typical of that species. Further studies and the critical examination of specimens have now indicated that the eastern Australian populations are distinct from those of *D. commixta* in inland Western Australia.

Materials and methods

This revision is based on specimen holdings in BRI, CANB, MEL, NSW and PERTH.

Taxonomy

Duperreya Gaudich., in Freycinet, *Voyage Autour du Monde... sur les Corvettes de S. M. l'Uranie et la Physicienne. Botanique* t. 63 (1828); 452 (1829). **Type:** *D. sericea* Gaudich.

Perennials with climbing stems, woody at the base; indumentum sericeous, comprising appressed bifid hairs. Leaves shortly petiolate; blade linear to linear ovate, entire, with a

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single pair of secondary veins arising from above the base of the blade. Inflorescence axillary, cymose; peduncle slender, with 2 persistent and opposite bracteoles, bearing a single flower; pedicel absent. Sepals 5, free, quincuncial, enlarging and becoming scarious at fruiting with 3–5 prominent longitudinal veins. Corolla campanulate to slightly funnel-shaped, shallowly 5-lobed, with sparsely hairy midpetaline bands. Stamens 5; filaments flattened and dilated downwards, fused to the corolla tube at the base, glabrous or tuberculate; anthers ovate-oblong, sagittate, apex rounded and emarginate, dehiscing longitudinally with no twisting. Ovary 1-celled, glabrous; ovules 2, basal; disc annular; style 1, filiform and bearing a bi-globose stigma. Utricle chartaceous, with a persistent style base, indehiscent; seed 1, glabrous, with a basal circular hilum.

***Etymology*:** Named in honour of Louis-Isidore Duperrey, a marine officer, hydrologist and plant collector who accompanied Gaudichaud on the "Uranie" during the Freycinet expedition of 1817–1820.

***Distribution*:** The genus is endemic to Australia and the three species occur in subtropical to warm temperate, arid to semi-arid areas.

***Relationships and Diagnostic Characters*:** Hallier (1893) described the tribe *Poraneae* which included *Porana* and a number of other non-Australian genera. However, studies by Staples (1990) and Stefanovic *et al.* (2002) indicated that *Poraneae* was not monophyletic and embraced a number of unrelated genera. This has led to a reallocation of the genera assigned to the *Poraneae* (Stefanovic *et al* 2003). *Porana* was transferred to the tribe *Dichondreae* (Choisy) Choisy, while some other genera including *Duperreya* were incorporated in a new tribe *Cardiochlamyeae* Stefanovic & Austin. The closest relatives of *Duperreya* are the genera *Cordisepalum* Verdc., *Dinetus* Sweet, *Poranopsis* Roberty and *Tridynamia* Gagnep., all of which occur in southeast Asia. *Duperreya* is distinguished from these genera in having narrower leaves and solitary flowers. Staples (2006) also found the pattern of leaf venation in *Duperreya* (a single pair of secondary veins departing from the midvein near the base of the blade) distinguished it from its near relatives (with two pairs of secondary veins arising from the base).

Key to the species of *Duperreya*

1 Outer sepals narrowly ovate to narrowly elliptic, with L:B ratio >3, 3.5–6 mm wide at fruiting . . . . . **1. D. commixta**

1. Outer sepals ovate to elliptic with a L:B ratio <2.5, >8 mm wide at fruiting 2

2 Outer sepals 3–5.5 mm wide at flowering with a L:B ratio <2 and 10–19 mm wide at fruiting with a L:B ratio of <1.5 . . . . . **2. D. sericea**

2. Outer sepals 2.5–3 mm wide at flowering with a L:B ratio >2 and 8–11 mm wide at fruiting with a L:B ratio of >1.5 . . . . . **3. D. halfordii**

1. Duperreya commixta (Staples) Staples, *Blumea* 51: 451 (2006); *Porana commixta* Staples, *Nuytsia* 6: 52 (1987). **Type:** Western Australia. 52 km W of Wiluna, 29 August 1970, *P.G.Wilson 8965* (holo: PERTH *n.v.*; iso: A *n.v.*, CANB *n.v.*, K *n.v.*).

***Illustration*:** Staples (1987: 53 fig 1; 55 fig 2), as *Porana commixta*.

Perennial; stems climbing, woody at the base, moderately to densely sericeous, becoming ± glabrous with age; bifid hair arms 0.1–0.3 mm long. Leaf petiole 0.3–1 (–2) mm long, 0.02–0.06 times as long as the blade; blade linear to linear-ovate, 15–50 mm long, 1–5 mm wide with a length:breadth ratio of 7.5–20, apex acute, base rounded to obtuse, sparsely to moderately densely sericeous above,

moderately densely sericeous below. Peduncle 6–16 mm long; bracteoles linear to narrowly elliptic, 2.5–5 mm long, 0.75–1.2 mm wide, extending to 6 × 1.5 mm at fruiting, vestiture as for the leaves. Outer sepals narrowly oblong-elliptic to narrowly ovate, 5–8 mm long, 1.5–2.5 mm wide, with a length:breadth ratio of 3–3.5, apex acute to obtuse, base obtuse to rounded, becoming chartaceous and extending to 19 mm × 6 mm at fruiting with the length:breadth ratio increasing to 4, becoming rounded at the apex, moderately to densely sericeous, becoming sparse with age, with 5 prominent longitudinal veins; inner sepals linear to narrowly elliptic, 5–6.5 mm long, 1–2.5 mm wide, with a length:breadth ratio of 3.5–5.5, apex barely acute to obtuse extending to 17 mm × 6 mm at fruiting. Corolla blue to pale blue, slightly lobed; petals 8–12 mm long, 6–8 mm wide at the rim, rounded-triangular, apiculate at the distal end, sparsely to very sparsely hairy on the midpetaline band for 4–5 mm. Stamen filaments 2.5–4 mm long, fused to the base of the corolla tube for 0.5–0.9 mm; anthers 1.5–1.85 mm long, 0.8–0.9 mm wide, basal lobes 0.3–0.4 mm long. Ovary 0.9–1.3 mm high; style 3.5–5 mm long. Utricle ellipsoid to slightly obovoid, 5.5–6.5 mm long, glabrous or with a few apical hairs, longitudinally striated; seed 4–5 mm long. **Fig. 1A & 1B.**

***Additional selected specimens (49 examined)*: Western Australia.** 9 miles [14.7 km] E of Wittenoom, Aug 1965, *Beauglehole 11546* (BRI, MEL, PERTH); 6 km S of Agnew, Leonora road, Sep 1978, *Beauglehole & Errey ACB59624* (PERTH); Coombawan Windmill, Wonganoo Station, Aug 1999, *Boladeras 86* (PERTH); on Murlunmuylurna walk at crossing pool, Millstream, Jul 2004, *Byrne 1097* (PERTH); E side of Lyndon – Williambury road, Williambury, Aug 1981, *Cranfield 1842* (PERTH); 1.4 km N of Tindler Bore, Melangata Station, Sep 1987, *Cranfield 6166* (PERTH); Mt Magnet, Sep 1903, *Fitzgerald s.n.* (NSW645799, PERTH); Laverton, Sep 1909, *Maiden s.n.* (NSW181028); near Wittenoom Gorge, *c.* 100 miles [161 km] S of Marble Bar, 1952, *McMahon s.n.* (NSW645801); *c.* 30 km SW of Balfour Downs Homestead on track to Ethel Creek Homestead, Sep 1995, *Mitchell PRP541* (BRI, PERTH); Dairy Creek Station, *c.* 4 km N of homestead, Aug 2003, *Patrick et al. SP4813* (PERTH); "Palm Springs", S tributary of Fortescue River, Oct 1974, *Rodd 2826* (NSW); near Meekatharra, Oct 1958, *Speck 1501* (CANB, NSW, PERTH); 20 km NNW of New Springs Homestead, Sep 1979, *Toelken 6296* (AD, BRI); on NW Coastal Highway, 32 miles [51.5 km] S of Minilya Roadhouse, Sep 1976, *Whaite & Whaite 4201B* (NSW); 9.7 km S of Bullstag Well, "Balfour Downs", Sep 1991, *Wilson 967 & Rowe* (NSW). **Northern Territory.** 2.5 km N. Puntitjata Outstation, Oct 2001, *Albrecht 10089* (DNA, PERTH).

***Distribution and habitat*:** *Duperreya commixta* occurs in inland Western Australia from the Hamersley Ranges in the north to Laverton in the south (**Map 1**). It has also been recorded from the south western corner of the Northern Territory. It grows on rocky escarpments and along creeklines, on sandy, loamy or sandy-clay soils in *Acacia* thickets (especially mulga and lancewood) and in bloodwood woodlands.

***Phenology*:** Flowering occurs in the late winter to spring from July to November with fruiting specimens collected through to March.

***Notes*:** The specimen of *Duperreya commixta* collected by David Albrecht from 2.5 km N of Puntitjata Outstation in the far southwest of the Northern Territory currently appears to be from a remote outlier more than 500 km to the east of the main population.

***Conservation status*:** This species does not appear to be under threat and is given no conservation status in Western Australia. However, the population discovered in the far southwest of the Northern Territory is significant from a conservation point of view given its disjunction.

***Etymology*:** The specific epithet is derived from the Latin *commixtio*, mixture, referring to the fact that specimens of this species were mistaken for *D. sericea.*

2. Duperreya sericea Gaudich. in Freycinet, *Voyage Autour du Monde... sur les Corvettes de S. M. l'Uranie et la Physicienne. Botanique* t. 63 (1828); 452 (1829); *Porana sericea* (Gaudich.) F.Muell., *Fragm.* 6: 100 (1867). **Type:** Western Australia. Novae Hollandiae ora occidentail (baie des Chiens-Marins) [Shark Bay], *C.Gaudichaud s.n.* (holo: P *n.v.*; iso: G *n.v.*); *fide* Staples (1986: 56).

Ipomoea modesta F.Muell., *Fragm.* 2: 22 (1860), *nom. illeg. non* Choisy (1854). **Type:** Western Australia. "in virgultis ad flumen Murchison", *A.F.Oldfield s.n.* (holo: MEL *n.v.*; iso: K *n.v.*).

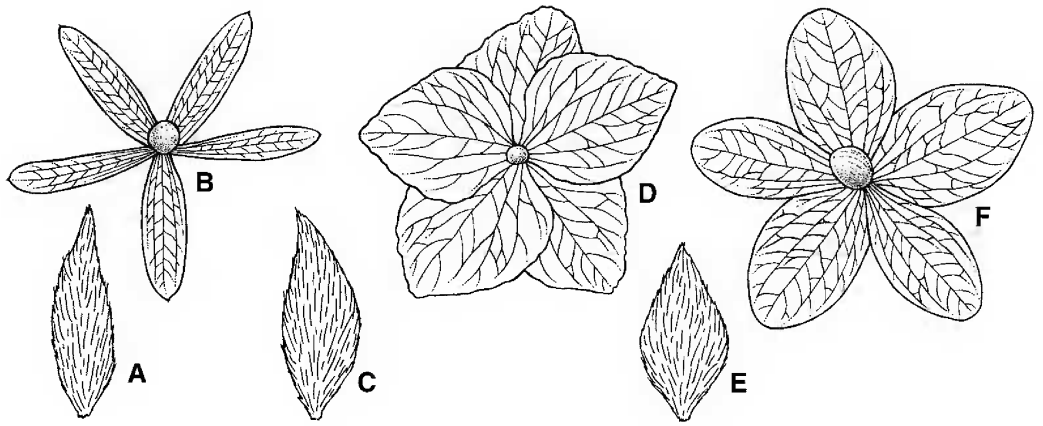

Fig. 1. ***Duperreya commixta***. A. outer sepal at flowering × 5, *Mitchell 541* (BRI). B. calyx at fruiting × 2, *Wilson & Rowe 967* (NSW). ***D. sericea***. C. outer sepal at flowering × 5, *Corrick 8153* (BRI). D. calyx at fruiting × 2, *Wilson & Rowe 1178* (NSW). ***D. halfordii***. E. outer sepal at flowering × 5, *Benson & Cooper s.n.* (BRI [AQ477737]). F. calyx at fruiting × 2, *Cunningham 520* (NSW). Del. B.Connell.

***Illustrations*:** Staples (1987: 58, fig. 4), as *Porana sericea*; Staples (2006: 454, fig. 11).

Perennial; stems climbing, woody at the base, moderately dense to densely sericeous, becoming ± glabrous with age; bifid hair arms 0.1–0.3 (-0.7) mm long. Leaf petiole 0.5–2 mm long, 0.02–0.06 times as long as the blade; blade linear to linear-ovate, 15–65 mm long, 2–6 mm wide, with a length:breadth ratio of 6.5–14.5, apex acute to barely obtuse, often slightly acuminate, base rounded to obtuse, moderately dense to densely sericeous on both sides. Peduncle 6–14 mm long; bracteoles elliptic, occasionally ovate or obovate, 2.7–4.5 mm long, 1–1.5 mm wide, extending to 5 × 2 mm at fruiting, vestiture as for the leaves. Outer sepals broadly ovate to broadly elliptic, 5–8 mm long, 3–6 mm wide, with a length: breadth ratio of 1.4–1.6, becoming chartaceous, broader to almost orbicular and extending to 18 mm × 17 mm at fruiting with the length: breadth ratio decreasing to 1.1, apex acute to obtuse, becoming rounded, mucronulate, base obtuse to rounded, moderately densely sericeous becoming sparse with age, with 5 prominent longitudinal veins; inner sepals ovate-elliptic to elliptic, 5–7.5 mm long, 2.8–4 mm wide, with a length:breadth ratio of 1.2–1.9, extending to 16 mm × 15 mm at fruiting, apex barely acute to obtuse. Corolla blue to pale blue, slightly lobed, petals 8–12 mm long, 7.5–10 mm wide at the rim, rounded-emarginate, apiculate at the distal end, sparsely hairy on the midpetaline band for 4–5 mm. Stamen filaments 3–4.5 mm long, fused to the base of the corolla tube for 0.75–1 mm, glabrous or with an occasional low tubercle at the base; anthers 1.5–1.75 mm long, 0.75–0.85 mm wide, basal lobes 0.3–0.5 mm long. Ovary 0.8–1.2 mm high; style 4–5 mm long. Utricle obovoid to ellipsoid, 3.5–5 mm long, glabrous, surface wrinkled and longitudinally striated; seed 3–4 mm long. **Fig. 1C, 1D.**

***Additional selected specimens (34 examined)*: Western Australia.** NW of Geraldton, Aug 1967, *Ashby 2266* (AD, BRI, PERTH); Woodleigh Station, E of Perth – Carnarvon road, Murchison, Aug 1960, *Burbidge 6456* (BRI, CANB); 12 km N of Murchison River, Oct 1960, *Byrnes 4028* (BRI, PERTH); Mount Elvire Station, Sep 1990, *Chapman & Kealley 90-26* (PERTH); near Murchison River, *c.* 5 km upstream of Kalbarri, Sep 1982, *Corrick 8153* (BRI, MEL); Pullagaroo Hill, Nov 1992, *Cranfield 8646A* (PERTH); 3 miles [*c.* 5 km] SE of Gravaloo Homestead, Sep 1970, *George 10185* (PERTH); between Kunnunoppin & Mt Marshall & Lake Barlee, 1919, per *Grasby s.n.* (NSW181029); Isseka Road East, Northampton, Aug 1999, *Shepherd 131* (PERTH); *c.* 12 km from Denham along main road to Monkey Mia, Aug 1986, *Short 2458* (MEL, PERTH); on NW Coastal Highway, 32 miles [51.5 km] S of Minilya Roadhouse, Sep 1976, *Whaite & Whaite 4201A* (NSW); 29.8 km N of Meka Homestead, Sep 1991, *Wilson 1172 & Rowe* (NSW, PERTH); 7.5 km N of Murchison Shire Office, Sep 1991, *Wilson 1178 & Rowe* (NSW, PERTH); 10 km N of Murchison River on NW Coastal Highway, Sep 1979, *Wilson 2657* (NSW).

***Distribution and habitat*:** *Duperreya sericea* is found in coastal Western Australia from between Exmouth and Geraldton in the north to Northampton in the south, extending in the southern part of its range as far east as Menzies (**Map 1**). It grows in *Acacia* shrublands and heath along creeklines and on rocky escarpments, mainly on red sandy soils. In inland areas it is commonly found on granite.

***Notes*:** Two specimens from the Swan River and Blackwood River housed in European herbaria were cited by Staples (1987). These collections were made in the 1800's. I am unaware of any collections in Australian herbaria from this area and in recent floras of this region the species is not listed. If the identification and locality information is correct then it appears this species no longer occurs in this area.

***Phenology*:** Flowering occurs in the late winter to spring, from July to October with fruiting recorded through to April.

***Conservation status*:** This species does not appear to be under threat and is given no conservation status in Western Australia.

***Etymology*:** The specific epithetic refers to the sericeous indumentum which characterises this species.

3. Duperreya halfordii R.W.Johnson **species nova** differt a *D. commixta* sepalis praesertim fructiferis latioribus et sepalis florentibus, corolla, staminibus et stylis brevioribus. **Typus:** New South Wales. Lower part of gorge on W side of Mt Gunderbooka, 7 November 1987, *P.G.Wilson 166 & D.I.Wilson* (holotypus: BRI; isotypi: MEL *n.v.*, NSW *n.v.*).

***Illustrations*:** Cunningham *et al.* (1981: 557), as Climbing Bindweed (*Porana sericea*); Johnson (1992: 378), as *Porana commixta*.

Perennial; stems climbing, woody at the base, moderately dense to densely sericeous, becoming ± glabrous with age; bifid hair arms 0.1–0.25 mm long. Leaf petiole 0.5–2 mm long, 0.03–0.07 times as long as the blade; blade linear to linear-ovate, 10–35 mm long, 1–4 mm wide with a length:breadth ratio of 8.5–11.5, apex acute to barely obtuse, base rounded to obtuse, moderately to densely sericeous on both sides. Peduncle 9–10 mm long at flowering, up to 16 mm long at fruiting; bracteoles narrowly ovate to elliptic, 3–4 mm long, 0.9–1.5 mm wide, extending to 7 × 3.5 mm at fruiting, vestiture as for the leaves. Outer sepals ovate to ovate-elliptic, 4.5–6 mm long, 2–3 mm wide, with a length: breadth ratio of 2–2.4, apex acute to obtuse, base attenuate to obtuse, becoming broadly ovate, chartaceous and extending to 20 mm × 11 mm at fruiting with the length:breadth ratio decreasing to 1.5, rounded to almost emarginate at the apex, moderately to densely sericeous, becoming sparse with age with 5 prominent longitudinal veins; inner sepals elliptic to oblong-elliptic, 4.5–6 mm long, 1.8–2 mm wide, with a length:breadth ratio of 3.5–5.5, apex barely acute to obtuse, extending to 18 mm × 10 mm at fruiting and becoming obtuse to rounded at the apex. Corolla blue, slightly lobed, petals 7–10 mm long, 5–6 mm wide at the rim, rounded, sometimes emarginate at the distal end, sparsely hairy on the midpetaline bands for 3.5–4.5 mm. Stamen filaments 3.2–3.8 mm long, fused to the base of the corolla tube for 0.5–0.75 mm, glabrous or with an occasional low tubercle at the base; anthers 1.25–1.45 mm long, 0.6–0.7 mm wide, basal lobes 0.3–0.4 mm long. Ovary 1–1.4 mm high; style 3.5–4 mm long. Utricle ellipsoid, 4.5–5.5 mm long, glabrous or with a few hairs, surface wrinkled and longitudinally striated; seed 4–4.5 mm long. **Fig. 1E & 1F, Fig 2.**

***Additional specimens examined*:** **Queensland.** WARREGO DISTRICT: Cunnamulla area, Feb 1972, *Pike 24* (BRI); mesa on Norley Homestead, *c.* 30.4 km N of Thargomindah, Jun 1955, *Smith 6344* (BRI). **New South Wales.** Cobar District, Oct 1970, *Althofer 147* (NSW); 13.3 km W of Cobar on Barrier Highway on S side of road, Nov 1984, *Benson & Cooper s.n.* (NSW645796); "Mulgowan", Nov 1984, *Benson & Cooper s.n.* (NSW251205); Mt Oxley, *c.* 20 miles [32.2 km] ESE of Bourke, Oct 1963, *Constable 4510* (NSW); 15 km W of Cobar P.O. along Barrier Highway towards Wilcannia, Dec 1986, *Crisp 7878* (CANB [CBG], NSW); Mark's paddock, "Burrawa", Dec 1969, *Cunningham 86* (NSW); 8 miles [12.9 km] W of Cobar, Nov 1972, *Cunningham 70* (NSW); 8 miles [12.9 km] W of Cobar, Nov 1972, *Cunningham 520* (NSW); 14.5 km W of Cobar on Barrier Highway, Oct 1974, *Cunningham & Milthorpe 2972* (NSW); 8 miles [12.9 km] W of Cobar, Oct 1911, *Haviland s.n.* (NSW251201); Tundulya, *c.* 25 miles [40.2 km] SE of Louth, Apr 1967, *Moore 4869* (CANB, NSW); Cobar, Dec 1905, *Watkin s.n.* (NSW181027); "Mt Gap", hill to SE of homestead, Nov 1987, *Wilson 169* & *Wilson* (BRI, NSW).

Fig. 2. ***Duperreya halfordii***. A. flowering branchlet × 1. B. flower × 4. C. corolla opened, with androecium × 4. D. ovary and style × 8. All from *Cunningham & Milthorpe 2972* (NSW). Del. W.Smith.

Distribution and habitat: *Duperreya halfordii* occurs in south-western Queensland and western New South Wales from Cunnamulla in the north to Cobar in the south (**Map 1**). It grows on rocky hills and along stoney creeklines in *Acacia* thickets particularly mulga (*Acacia aneura*) and lancewood (*A. shirleyi*), and in red box (*Eucalyptus intertexta*) and leopardwood (*Flindersia maculosa*) communities on sandy or loamy, often shallow, red soils.

Phenology: Flowering has been recorded from September to November with fruiting through to February.

Notes: Staples (2006) noted that plants of *Duperreya commixta* from around Cobar had wider sepals than those from Queensland and Western Australia but the sepals appeared intermediate in size between *D. sericea* and other specimens of *D. commixta*. In other respects he concluded the Cobar population was typical of *D. commixta*. Following the study of many more specimens that were seen by Staples it now appears that the eastern Australian populations are quite distinct from those in the west. There is a clear disjunction in the width of the outer sepals at fruiting and in the length:breadth ratio. The bracteoles at fruiting are larger in *D. halfordii* while the corolla, filaments and style are shorter.

Etymology: Named in honour of David Halford, colleague, whose taxonomic and editorial assistance in preparing an account of the family Convolvulaceae for the *Flora of Australia* has been greatly appreciated.

***Conservation status*:** This species does not appear to be under threat and is given no conservation status in New South Wales. The populations in Queensland are rare and no collections have been made during the past 30 years.

Acknowledgements

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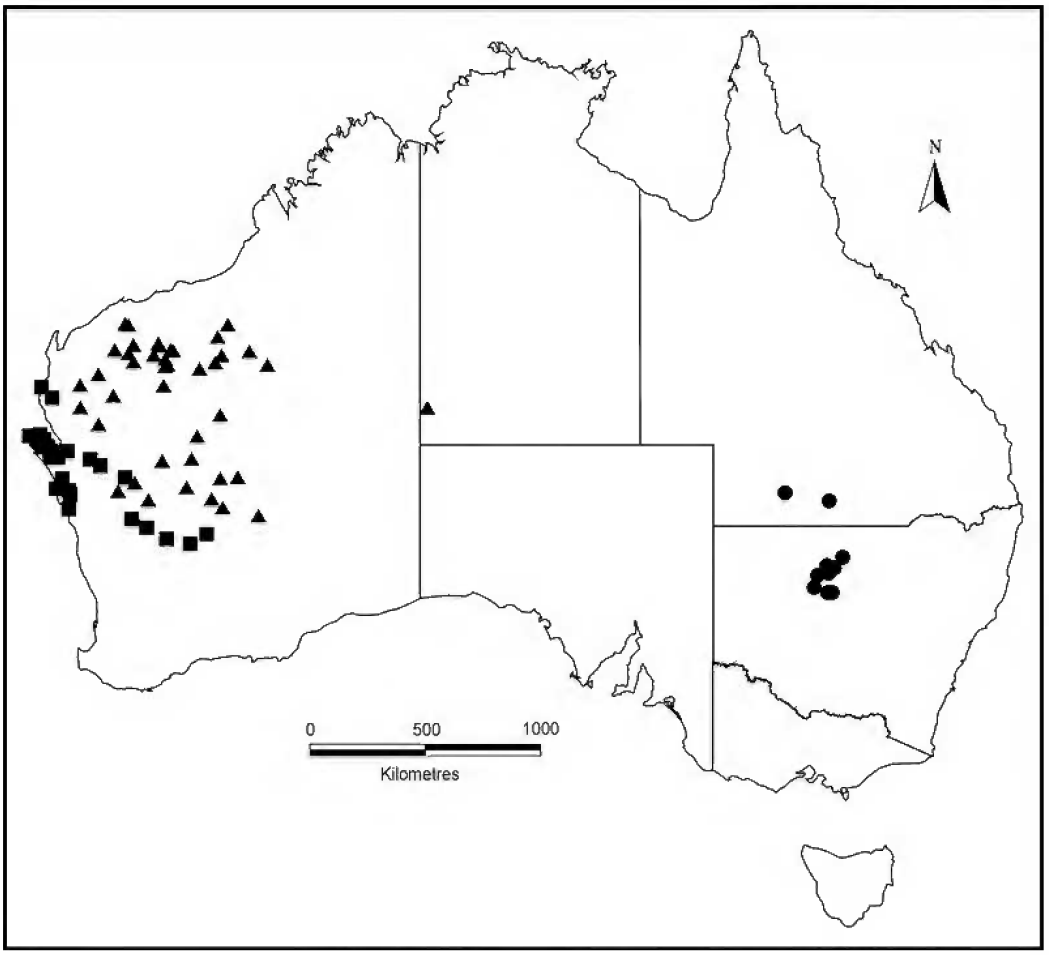

Map 1. Distribution of *Duperreya commixta* (▲), *D. sericea* (■), *D. halfordii* (●).